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Washington, D.C. 20005
Phone 202 326-8894
Fax 202 408-4806

EX PARTE OR LATE FILED

ORIGINAL

July 2, 1999

Ex Parte

Ms. Magalie R. Salas
Secretary
Federal Communication Commission
Room TW-A325,The Portals
445 Twelfth Street
Washington, D.C. 20554

Re: CC Docket No. 98-137, In the Matter of 1998 Biennial Review—Review of Depreciation Requirements for Incumbent Local Exchange Carriers

ASD Docket No.98-91, USTA Petition For Forbearance from Depreciation Regulation

CC Docket No. 98-177, In the Matter of 1998 Biennial Regulatory Review—Petition for Section 11 Biennial Review filed by SBC Communications Inc., Southwestern Bell Telephone Company, Pacific Bell and Nevada Bell

ASD Docket No. 98-97, In the Matter of United States Telephone Association Petition for Rulemaking-1998 Biennial Regulatory Review

Dear Ms. Salas:

In accordance with the Commission's rules, please be advised that on July 1, 1999, Mr. Larry Vanston of Technology Futures Inc. (TFI), Ms. Kathy Levitz of Bell South, Mr. Tony Alessi of Ameritech, Mr. Scott Randolph of GTE and the undersigned[1] met with Mr. Howard Shelanski, Chief Economist and Mr. Pat DeGraba, Deputy Chief Economist of the Office of Plans and Policy, Mr. Jay Atkinson of the Competitive Pricing Division, Mr. Bob Loube of the Accounting Policy Division and Mr. Thomas David of the Accounting Safeguards Division of the FCC.

The purpose of the meeting was to provide the Commission with detailed information requested on models used to develop forward looking economic lives used by telecommunications carriers in depreciation. The materials discussed by Mr. Vanston are attached.

[1] USWest also sponsored Mr. Vanston but was unable to attend this meeting.

In this meeting, the Companies also urged the FCC to grant the Petition filed by USTA to forbear from regulating depreciation lives and rates. With forbearance Local Exchange Carriers (LECs) will use the same lives based upon Generally Accepted Accounting Principles ("GAAP") for both FCC reporting purposes and external reporting GAAP purposes.

A summary of the discussion is outlined in the attached. Also attached is a copy of the publication, "Transforming the Local Exchange Network." ©[2] An original and one copy of this letter and the attachments are being submitted. Acknowledgement and date of receipt of this transmittal are requested. A duplicate transmittal letter is attached for this purpose.

Please include this letter in the record of these proceedings in accordance with Section 1.1206(a)(2) of the Commission's Rules.

If you have any questions on this, please do not hesitate to contact Ms. Jeannie Fry at 202-326-8894.

Sincerely,

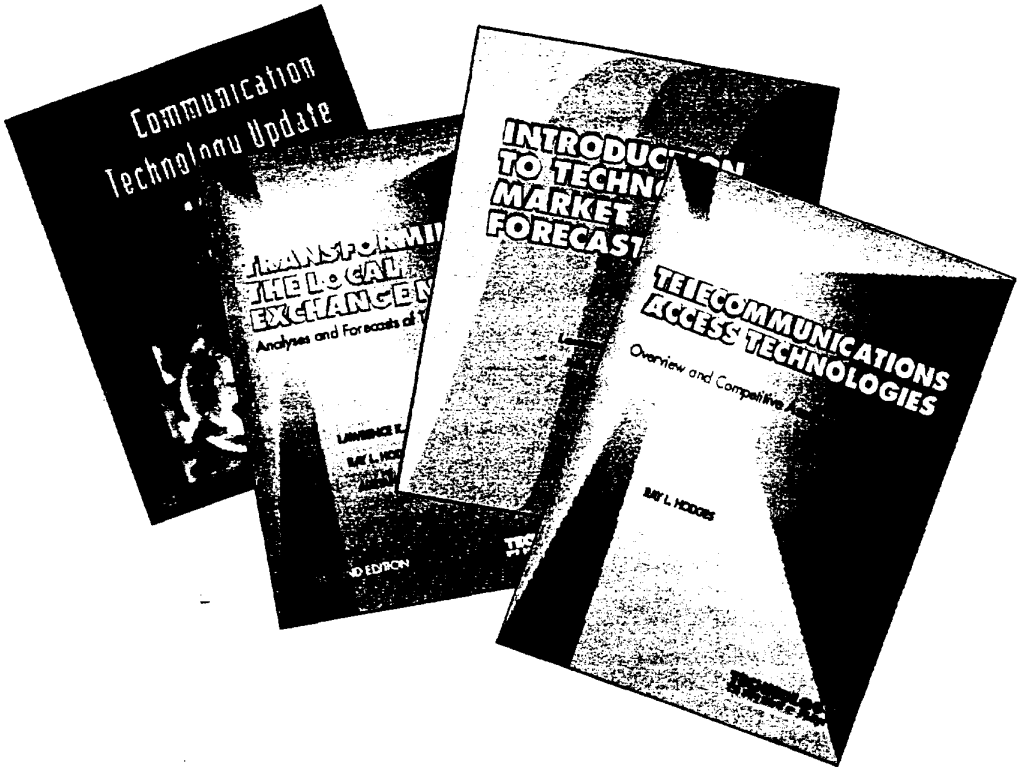
Attachments

[2] Please note that this document is copyrighted and therefore copying restrictions apply. However, this document is publicly available. See "Transforming the Local Exchange Network: Analyses and Forecasts of Technology Change," Technology Futures Inc., 2nd Edition, 1997. For additional information, contact Mr. Larry Vanston at 512.258.8898.

Cc: Mr. Larry Strickling, Chief of the Common Carrier Bureau
Mr. Ken Moran, Chief, Accounting Safeguards Division
Mr. Tim Peterson, Deputy Chief, Accounting Safeguards Division
Mr. Thomas David, Accounting Safeguards Division
Mr. Howard Shelanski, Office of Plans and Policy
Mr. Pat DeGraba, Office of Plans and Policy
Mr. Jay Atkinson, Competitive Pricing Division
Ms. Lisa Zaina, Deputy Bureau Chief, Common Carrier Bureau
Mr. Bill Bailey, Counsel, Common Carrier Bureau,
Mr. Don Stockdale, Common Carrier Bureau
Mr. Bob Loube, Economist, Accounting Policy Division
Mr. Craig Brown, Deputy Chief, Accounting Policy Division

TECHNOLOGY FUTURES INC.

Publications



Communications Technologies

- *Telecommunications Access Technologies*
- *Wireless vs. Wireline for Voice Services*
- *Communication Technology Update*
- *Computer Technology Trends*
- *Wireless and Cable Voice Services*
- *Comparison of Economic Life Techniques*
- *Transforming the Local Exchange Network: 2nd Edition*
- *Advanced Video Services*
- *Depreciation Lives for Telecommunications Equipment*
- *Transforming the Local Exchange Network: 1994 Edition*

Forecasting Guides

- *Introduction to Technology Market Forecasting*
- *Technology Forecasting*
- *Practical Technology Forecasting*

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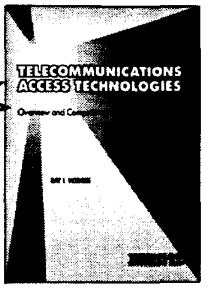
COMMUNICATIONS TECHNOLOGIES

Telecommunications Access Technologies: Overview and Competitive Assessment

NEW!

Ray L. Hodges



ISBN 1-884154-11-3

This new report provides a concise overview of the competitive access technologies—terrestrial wireless, satellite, and cable—that will impact the local exchange network. For ease of use and comparison, each chapter outlines the state of each technology, the key application areas and special strengths, weaknesses and limitations, key providers and users, market size, and forecasts of the technology adoption. Includes TFI's forecasts for analog, cellular, digital cellular/PCS, 2.5 and 3rd generation wireless, cable modems, cable voice, fiber-based CLECs, MMDS, LMDS, VSATs, and two generations of LEOs.

Contents

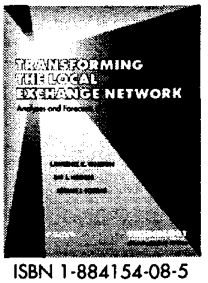
The Telecommunications Landscape • Traditional Wireline Telephone Network • Terrestrial Wireless • Cable Networks • Fiber-Based Competitors • Satellites

$495, March 1999, 115 pages, Softcover,
Sponsored by the TTFG*

Transforming the Local Exchange Network: Analyses and Forecasts of Technology Change

Second Edition

Lawrence K. Vanston, Ray L. Hodges, & Adrian J. Poitras



ISBN 1-884154-08-5

This edition provides TFI's latest forecasts of the adoption of key infrastructure technologies by local exchange carriers in North America. Quantitative data and forecasts, methodological details, and background information are included in the report. This second edition of *Transforming the Local Exchange Network* also provides TFI's latest recommendations for telecom equipment depreciation lives. These lives, based on the technology forecasts, are a reference standard for financial reporting, regulatory proceedings, and network planning.

Contents

Introduction and Summary • Drivers for Change • Forecasts for Fiber Adoption in the Outside Plant • SONET Circuit Equipment • Forecasts for Digital Switching and ATM

$995, August 1997, 270 pages, Softcover,
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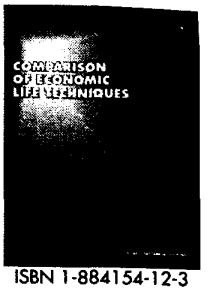
Comparison of Economic Life Techniques

NEW!

Stephen L. Barreca



ISBN 1-884154-12-3

The purpose of this study is to assess and document the effectiveness of three commonly-used life analysis techniques—traditional mortality, substitution, and combined obsolescence. To evaluate the accuracy of these three mortality models, three case studies of telecommunications network equipment are presented in this report. The studies use actual mortality experience compiled from over 74 state jurisdictions, involving hundreds of thousands of units of property. Additionally, actual technological performance data, collected from the entire U.S. telecommunications industry are used to document the pace of technological change.

Contents

Executive Summary • Introduction and Study Methodology • Case Study—Electromechanical Switching (EM) • Case Study—IOF Underground Metallic Cable • Case Study—Analog Stored Program Control Switching Equipment • Conclusions and Recommendations

$495, May 1999, 85 pages, Softcover,
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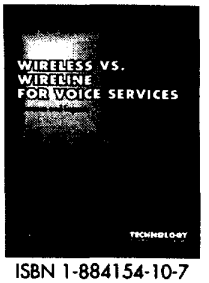
Wireless vs. Wireline for Voice Services: Forecasts and Impacts

Ray L. Hodges & Lawrence K. Vanston



ISBN 1-884154-10-7

The authors analyze the competitive threat to the LECs from the emerging wireless alternative for voice communications. The competitive impacts are reported in terms of a variety of variables, for example, access lines lost and message and non-message revenue lost. The average remaining life (ARL) of the LEC copper distribution infrastructure is also measured. The ARLs include not only the effects due to competition, but also the effect of the LEC transition to fiber.

Contents

Introduction and Summary • Cellular/PCS Forecasts • Competitive Impacts on the Wireline Network • Impacts of Wireline Cash Flows on Depreciation Lives

$495, April 1998, approx. 50 pages, Softcover,
Sponsored by the TTFG*

TTFG

The Telecommunications Technology Forecasting Group was established to promote the understanding and use of forecasting to predict and support the continuing evolution of the public telecommunications network. Some of the research reports listed in this catalog were commissioned by this industry consortium to quantify the demand for new telecom services and the impact on the public telecommunications network.

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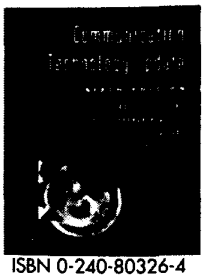
COMMUNICATIONS TECHNOLOGIES

Communication Technology Update

6th Edition

August E. Grant, Editor



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You're already an expert in your own field; what you need is a resource to help you keep up with what everyone else is doing. There is no other source (book, periodical, or Website) that provides a comprehensive overview of the history, latest developments, and current status of virtually every major communication technology. Revenues, user statistics, and other relevant data are included in most chapters to help you evaluate and compare technologies.

Contents

Introduction: The Umbrella Perspective on Communication Technology

Electronic Mass Media: Cable Television • Pay Television Services • Interactive Television • Direct Broadcast Satellites • Wireless Multipoint Distribution Services: MMDS & LMDS • Advanced Television • Radio Broadcasting

Computers & Consumer Electronics: Multimedia Computers & Video Games • Computers in Media: Media Asset Management • The Internet & the World Wide Web • Electronic Mail • Office Technologies • Document Printing Technologies • Virtual & Augmented Reality • The Digital Revolution in Home Video • Digital Audio

Telephony & Satellite Technologies: Local and Long Distance Telephony • Broadband Networks • Satellite Communications • Distance Learning Technologies • Cable Distributed Telephony & Data Services • Wireless Telephony: Cellular, PCS, & MSS • Personal Communication: Pagers, Palmtops, & PDAs • Teleconferencing

Conclusions: Trends in Selected U.S. Communications Media

$50, July 1998, 375 pages, Softcover

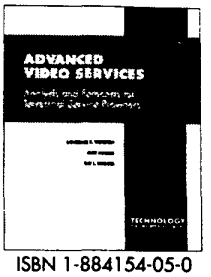
TFI ARCHIVE

- ***Personal Communications*** **$45**, 1993
- ***New Telecom Services & the Public Telephone Network*** **$45**, 1993 (Out of Print)
- ***Telecom for Television/Advanced Television*** **$45**, 1992
- ***Video Communications*** **$45**, 1992
- ***Local Area Network Interconnection*** **$45**, 1992
- ***Interactive Multimedia & Telecommunications*** **$45**, 1992
- ***Computer-Based Imaging & Telecommunications*** **$45**, 1991 (Out of Print)
- ***A Facsimile of the Future*** **$45**, 1991

All of these archive publications were sponsored by the TTFG*
Photo copies are available for Out of Print publications.

Advanced Video Services: Analysis and Forecasts for Terrestrial Service Providers

Lawrence K. Vanston, Curt Rogers, & Ray L. Hodges



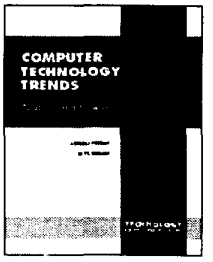
ISBN 1-884154-05-0

This report forecasts likely technology adoption strategies of the local telephone companies and assesses of the impact on their existing networks.

$495, 1996, 132 pages, Softcover, Sponsored by the TTFG*

Computer Technology Trends: Analysis and Forecasts

Adrian J. Poitras & Ray L. Hodges



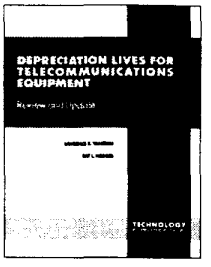
ISBN 1-884154-06-9

This insightful report focuses on the effects of technical progress in computers, along with continually expanding requirements and utiltity. Also covered is the rapid obsolescence and replacement of both existing and new computer assets and related equipment.

$495, 1996, 63 pages, Softcover, Sponsored by the TTFG*

Depreciation Lives for Telecommunications Equipment: Review and Update

Lawrence K. Vanston & Ray L. Hodges



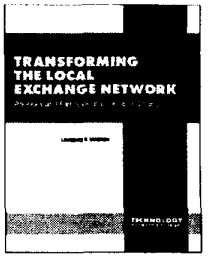
This 1995 report updates the calculations for depreciation lives and summarizes the results of TFI's 1994 research report, Transforming the Local Exchange Network: Analyses and Forecasts of Technology Change.

$45, 1995, 51 pages, Softcover, Sponsored by the TTFG*

Transforming the Local Exchange Network: Analyses and Forecasts of Technology Change

1994 Edition

Lawrence K. Vanston



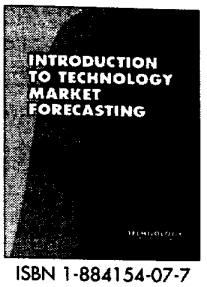
This research report quantifies the replacement of older telecom technologies with new high-speed, high-bandwidth telecom technologies—fiber optics, SONET, and ATM—by the LECs. It is focused primarily on the management of capital, including both the realistic assessment of the usefulness and longevity of existing assets, as well as the need for new investment to provide the basis for earnings, growth, competitiveness, and satisfied customers in the future.

$95, 1994, 200 pages, Softcover, Sponsored by the TTFG*

TECHNOLOGY FORECASTING GUIDES

Introduction to Technology Market Forecasting

Lawrence K. Vanston & John H. Vanston



ISBN 1-884154-07-7

This new monograph, written by leading technology forecasters, updates Ralph C. Lenz's monograph, *Rates of Adoption/Substitution in Technological Change*. This revision includes discussion and examples of several substitution models including the Fisher-Pry and Gompertz models.

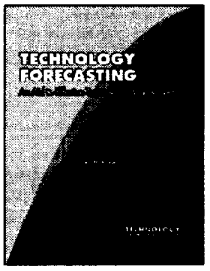
Contents

Introduction to Technology Market Forecasting • Processes and Patterns of Technology Adoption • The Process of Technological Substitution • The Process of Diffusion • The Process of Mortality • Mathematical Models for the Adoption of New Technology • Using Technology Market Models for Forecasting • Experience with Forecasting with Substitution Models

$25, 1996, 27 pages, Softcover, Sponsored by the TTFG*

Technology Forecasting: An Aid to Effective Technology Management

John H. Vanston



ISBN 1-884154-03-4

This management guide details technology forecasting techniques that will contribute to better decision making, and will provide assistance for organizations to improve planning, operations, and marketing.

$45, 1994, 1988, 59 pages, Softcover

Practical Technology Forecasting

James R. Bright

ISBN 1-884154-09-3

Technology forecasting describes a group of techniques that predict, in quantifiable terms, the direction, character, rate, implication, and impact of technical advance. People interested in the methodologies of technology forecasting will find this text indispensable. It provides an excellent introduction to, and overview of, most of the methods currently in use.

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❑ *Depreciation Lives for Telecommunications Equipment: Review and Update (1995)*	$45†		
❑ *Wireless and Cable Voice Services: Forecasts and Competitive Impacts (1995)*	$95†		
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Telecom

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Turmoil in this arena presents both users and suppliers of telecom services and equipment with unprecedented opportunities, as well as very serious threats. TFI provides information, forecasts, analyses, and strategic insights to support business decisions involving communications technologies and markets including voice, video, and data applications. In terms of talent, experience, and proven track record, TFI is uniquely qualified to assist forward-thinking companies to operate effectively in this rapidly-changing environment.

TFI Telecommunications services can enable you to:

- Identify, forecast, and evaluate advances in telecom technology and markets.
- Develop strategic technology, market, and financial plans.
- Provide outside review of plans and forecasts.
- Plan and supervise the installation of advanced communications systems.
- Estimate economic lives and depreciation schedules for telecom investment.
- Provide expert testimony in regulatory and other proceedings.

TFI Telecommunications is particularly valuable if you are a decision maker responsible for integrating market, financial, and technology factors.

Each year, TFI conducts a number of special research projects and publishes the results. Many of these projects and reports are sponsored by the **Telecommunications Technology Forecasting Group**, which is comprised of major North American local exchange carriers. Recent research projects include subjects such as advanced video services, computer technology, wireless and cable voice services, and the adoption of fiber, HDSL, SONET, and ATM in the local exchange network. TFI also presents the results of our continuing research activities in executive briefings and seminars.

Since 1993, TFI has published NTQ (*New Telecom Quarterly*), a journal that presents some of the forefront thinking on developments in the telecom industry and their consequences for the industry and its clients.

Clients include AT&T, GTE, Sprint, MFS, Bell Atlantic, U S WEST, GRC, Pacific Bell, Anchorage Telephone, Ameritech, Cincinnati Bell, Bell Northern Research, Bell Canada, Telepar (Brazil), and Telefonos de Mexico.

Technology Management

TECHNOLOGY MANAGEMENT

Today's rapid rate of advance causes technological factors to play a crucial role in most strategic decisions. To take full advantage of both emerging and existing technologies, a carefully-crafted technology management program is essential to the long-term success—even survival—of any large organization. Since all planning is based on projections of future trends and events, TFI's forecasting proficiency provides us with a unique capability to assist our clients in developing and implementing strong technology management programs.

TFI Technology Management services can help you:

- Construct technology development roadmaps.
- Promote technology transfer within and outside the organization.
- Develop new technology deployment strategies.
- Allocate R&D resources.
- Examine the financial implications of technology decisions.
- Ensure that technology and marketing strategies match.
- Obtain outside review of plans and forecasts.

Clients include IBM, SEMATECH, Baxter International, MCC, Chevron Chemical, SWB Technology Resources, British Petroleum, duPont, Texaco, and SaskTel.

Strategic Planning

STRATEGIC PLANNING

One of the results of re-engineering and downsizing programs is the realization that, to be successful in today's business environment, companies must be able to employ their resources in the most effective way to achieve both short- and long-term objectives. To accomplish this, you must carefully analyze the business opportunities available to you, select the ones that are most consistent with your capabilities and objectives, determine what additional resources you need, and develop a plan for optimal application of all available resources. This process is commonly called strategic planning, and it has been an area of particular interest to TFI since 1978.

TFI Strategic Planning services can assist you to:

- Analyze changing technical, market, or social factors to uncover emerging business opportunities.
- Integrate these opportunities into strategic plans.
- Identify mismatches between a company's projects, resources, and culture and its strategic goals.
- Initiate programs to correct these mismatches.
- Analyze possible and probable competitor strategies and actions.

Since planning is always based on projections about the future, TFI's experience in technology, market, financial, and business environment forecasting provides us with a powerful tool to assist you in strategic planning.

Clients include Arthur Andersen, Ethyl Chemical, McNeil Pharmaceuticals of Canada, the Gas Research Institute, General Motors, AT&T Paradyne, Stentor, FMC, and Kerr-McGee.

Forecasting

FORECASTING

The rapid pace of change in today's business environment magnifies the importance of quality forecasts. To prosper in this environment, you must be able to project future developments in an organized and timely manner. Almost 20 years of forecasting experience has made TFI one of the world's premier practitioners in this field. We actively use more than 20 different techniques that allow us to customize forecasting projects to your specific needs and preferences.

TFI Forecasting services can enable you to:

- Identify and evaluate new technology-based products and services.
- Project technology advances.
- Define market needs for new technologies.
- Project market adoption rates for new technologies.
- Formulate strategic models of future developments.
- Estimate economic lives and depreciation schedules for technology investments.
- Develop cash flow models for technology investments.

We will work closely with you to integrate your subject matter expertise with our forecasting capability. This ensures the forecast's relevance, validity, and acceptance and provides you and your organization with practical forecasting experience. We can also help you develop your own forecasting program or independently evaluate other forecasts.

Clients include 3M, ALCOA, Frontier, Advanced Micro Devices, BellSouth, Amoco, Bellcore, Weyerhaeuser, Southwestern Bell, and the Aluminum Association.

Strategic Market Research

STRATEGIC MARKET RESEARCH

No element of success in business is more important than the ability to:

- ❖ Identify and assess emerging market opportunities.
- ❖ Determine which opportunities are the most promising for your organization.
- ❖ Determine when and how these opportunities will develop over time.

Strategic market research aims at helping you profit in the long term by taking advantage of fundamental shifts in technologies, markets, and customer needs and desires. We utilize analytical techniques, expert opinion, and customer interviews to provide a rigorous, methods-based vision of future opportunities.

TFI Strategic Market Research services can help you:

- ♦ Identify and evaluate emerging market needs.
- ♦ Assess the potential market for new technologies.
- ♦ Project the rate at which new technologies will be adopted in the marketplace.
- ♦ Assist in developing plans for entering new markets.
- ♦ Assist in planning the entry of existing technologies into new market areas.
- ♦ Ensure that marketing and technology strategies match.

Many of our projects require us to determine *future* customer needs and match them with existing and new technologies. TFI's proven excellence in the area of technology forecasting can provide special insight into such technology/market interrelationships.

Clients include Texas Instruments, Kodak, Johnson & Johnson, Battelle, Corning, Edison Electric Institute, and Kraft Foods.

Financial Analysis

FINANCIAL ANALYSIS

Decisions related to the deployment, acquisition, and management of technology often revolve around financial projections. Unless the payback period is extremely short, these projections will necessarily include explicit or implicit assumptions and forecasts about the future as it relates to costs, prices, demand, market share, industry structure, risk, etc. Thus, such projections boil down to a set of forecasts of technologies, markets, and competition, and their interrelationships. TFI's forecasting experience assures that your financial projections—for both new and existing technology—reflect future realities and opportunities.

TFI Financial Analysis services can assist you to:

- ♦ Develop forecast-based cash flow models for technology decisions.
- ♦ Formulate financially and strategically sound technology replacement strategies.
- ♦ Determine the residual value and economic lives of existing assets.
- ♦ Communicate technology/financial realities to investors, regulators, tax authorities, and other decision makers.

TFI can provide or review key forecasts, assumptions, and inputs for your own financial models, or we can provide you with complete cash-flow models, including probabilistic simulations.

Clients include Arthur Andersen, the Southern Company, Southwestern Bell, and the Telecommunications Technology Forecasting Group.

TECHNOLOGY FUTURES INC.

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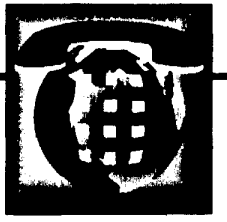
Biennial Review of Depreciation

- Companies use forward looking economic models, such as TFI, to set lives for externally reported GAAP depreciation lives and rates
- These forward looking economic models recognize those factors that make equipment idle or accelerate obsolescence--
  - Customer Demands
  - The Ever-Expanding Competitive Environment
  - Increased Pressure for Technologically Advanced Networks
    - Section 706 of the Telecommunications Act of 1996 (TA '96) states that "The Commission and each State Commission shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans...by utilizing...regulatory forbearance measures that promote competition...that remove barriers to infrastructure investment..."
- The TA '96 permits forbearance and requires the elimination of unnecessary rules and regulations--(Sec 10 of TA '96 and Sec 220(b) of '34 Act)
- **Now is the Appropriate Time to Forbear from Regulating Depreciation. With Forbearance Local Exchange Carriers will use the same GAAP lives for rates for both FCC reporting purposes and external reporting GAAP purposes.**



Technology Forecasting Approach to Economic Lives

Presentation to FCC Staff
Washington, D.C.
July 1, 1999

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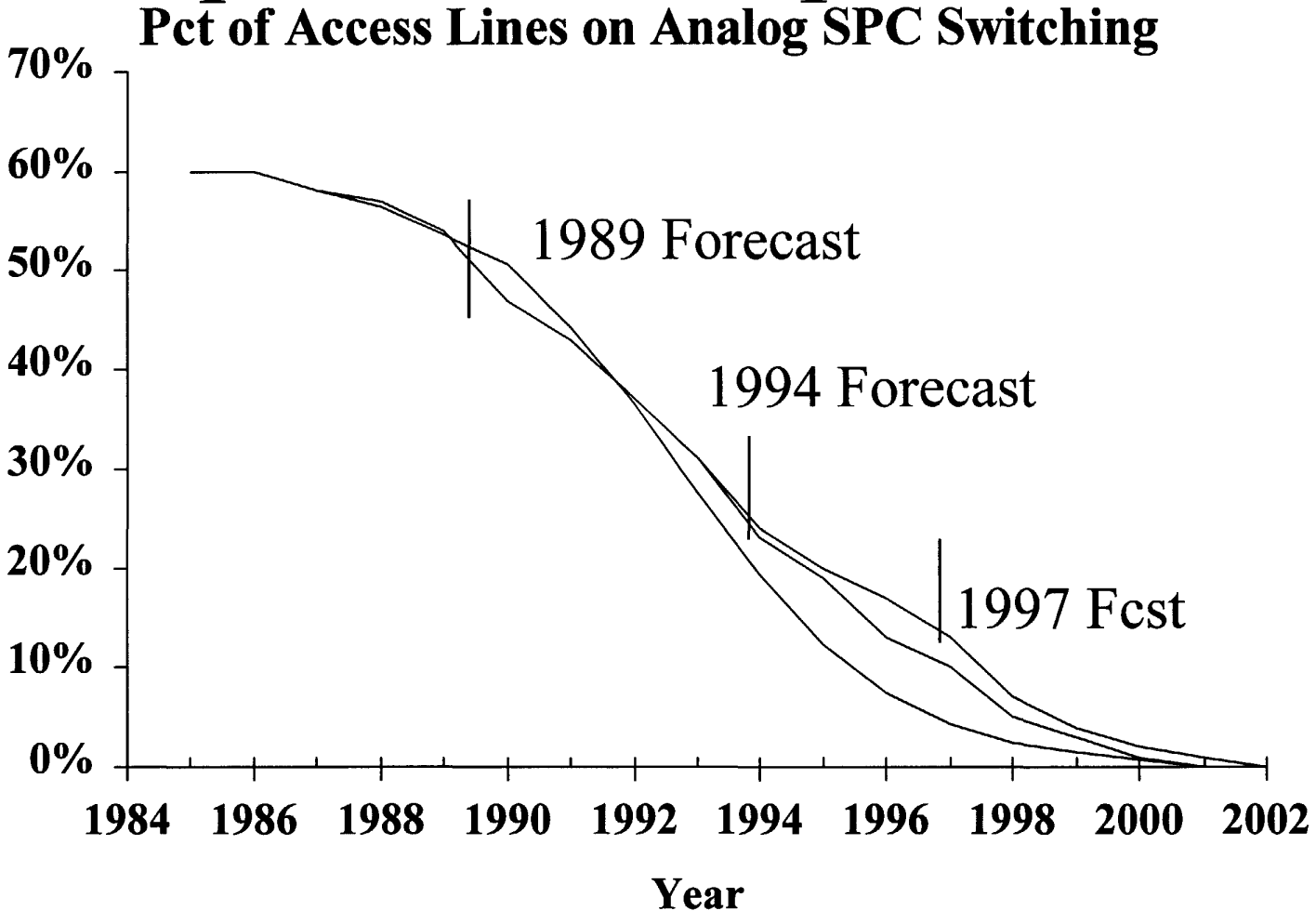
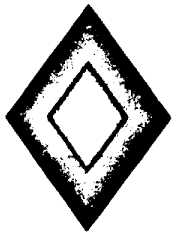
Sample Track Record

Year/ Technology	TFI Forecast Then	Situation Then	Common Wisdom Then	Situation Now
1986 Local Digital Switching	All local digital switching by 1997-2001	11% Digital, 60% Analog ESS & Growing	Few Analog ESS Retirements Before 2000	87% Digital; 100% by 2001
1987 Cellular Prices	Cellular total monthly cost (250 mins) down to $40-60 by 1997	Total monthly cost: $145	Cellular inherently expensive	$30 Monthly for 250 min. plans common
1987 Wireless vs. Wireline	Wireless will compete with wireline by the late 1990s	Wireless subscribers under 1 million	Wireless is strictly a complement to wireline	Wireless companies are targeting wireline
1988 Digital Loop Carrier	15% of access lines on fiber Digital Loop Carrier (DLC) by 1996	1% of access lines on fiber DLC	DLC only useful for long loops (<10% of access lines)	15% of access lines on fiber DLC in 1997
1989 SONET	40% of LEC fiber circuits on SONET in 1997	SONET in technical field tests	SONET promising but unknown	40% of LEC fiber circuits on SONET 1997
1990 Digital Comm. Services	Mass market for digital communication services will develop in 1990s	Severe problems rolling out ISDN	No need for digital; analog modems okay for mass market	High interest in xDSL and Cable Modems rollouts
1991 Electronic Image	Most computer-based images sent electron-ically by 2000	Most images sent by hard copy, disk-ette or tape, or fax	Varied	Internet/WANs handle wide variety of imaging
1992 Online Households	17% of US households will be online by 1997	Less than 1% of HHs online services	Videotex/Online Services "dead on arrival"	20% of all HHs online in 1997

Example of Past Experience





Overview

- Technology Forecasting
- Depreciation Lives and Technology Change
- TFI Forecasts
  - Outside Plant
  - Switching Equipment
  - Wireless vs. Wireline

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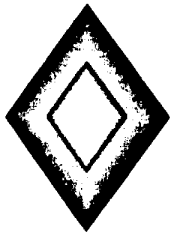

Technology forecasting is the process of using logical, reproducible methods to project, in a quantified manner, the intersection of market needs with new technical capabilities at selected times in the future.

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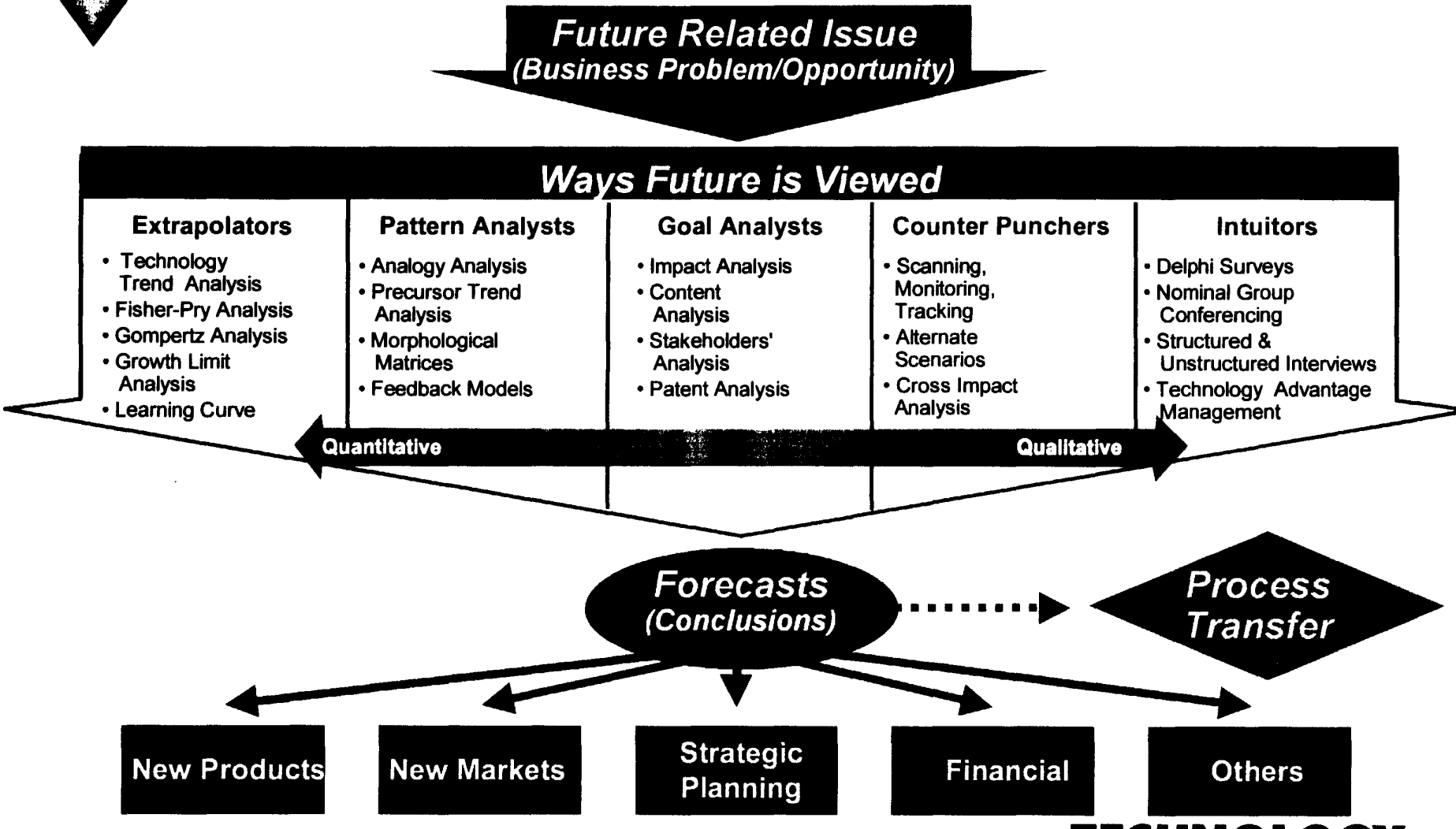
Technology Strategic Analysis



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Forecasting the Adoption of New Technologies

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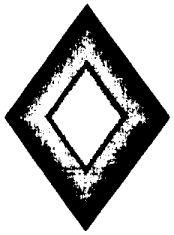

What are the Drivers of Technology Adoption?

- Old equipment wears out and is then replaced by new (Mortality)
- Early adopters teach and lead followers (Diffusion)
- Older equipment is forced out by the superior performance of newer technology (Substitution)

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When substitution is driven by superior technology, use the Fisher-Pry model. The new product or service must present some technological advantage over the old one.

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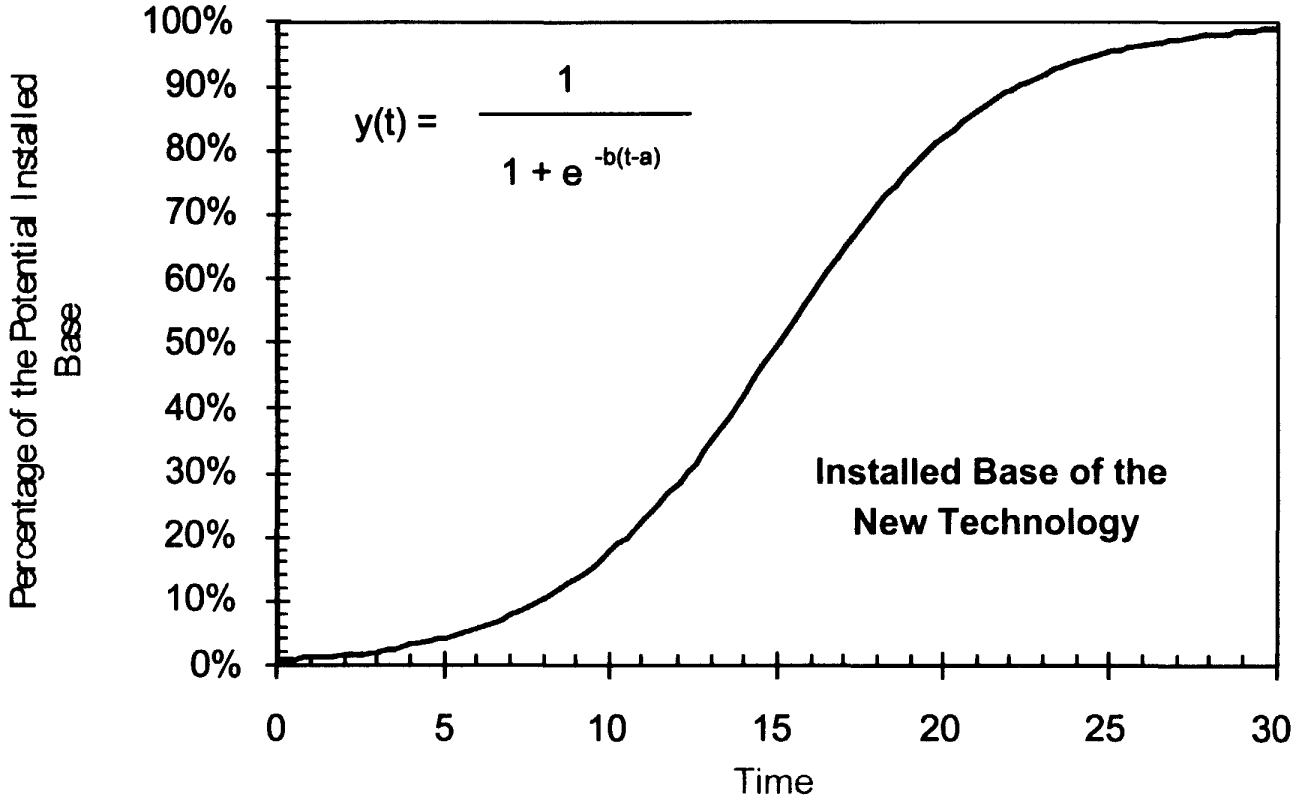
Fisher-Pry Substitution Pattern

S-Shaped Curve (General Shape of Substitution Model)



y(t) = Fraction of market taken over by new technology at time "t"

"a" and "b" are constants to be determined from substitution data

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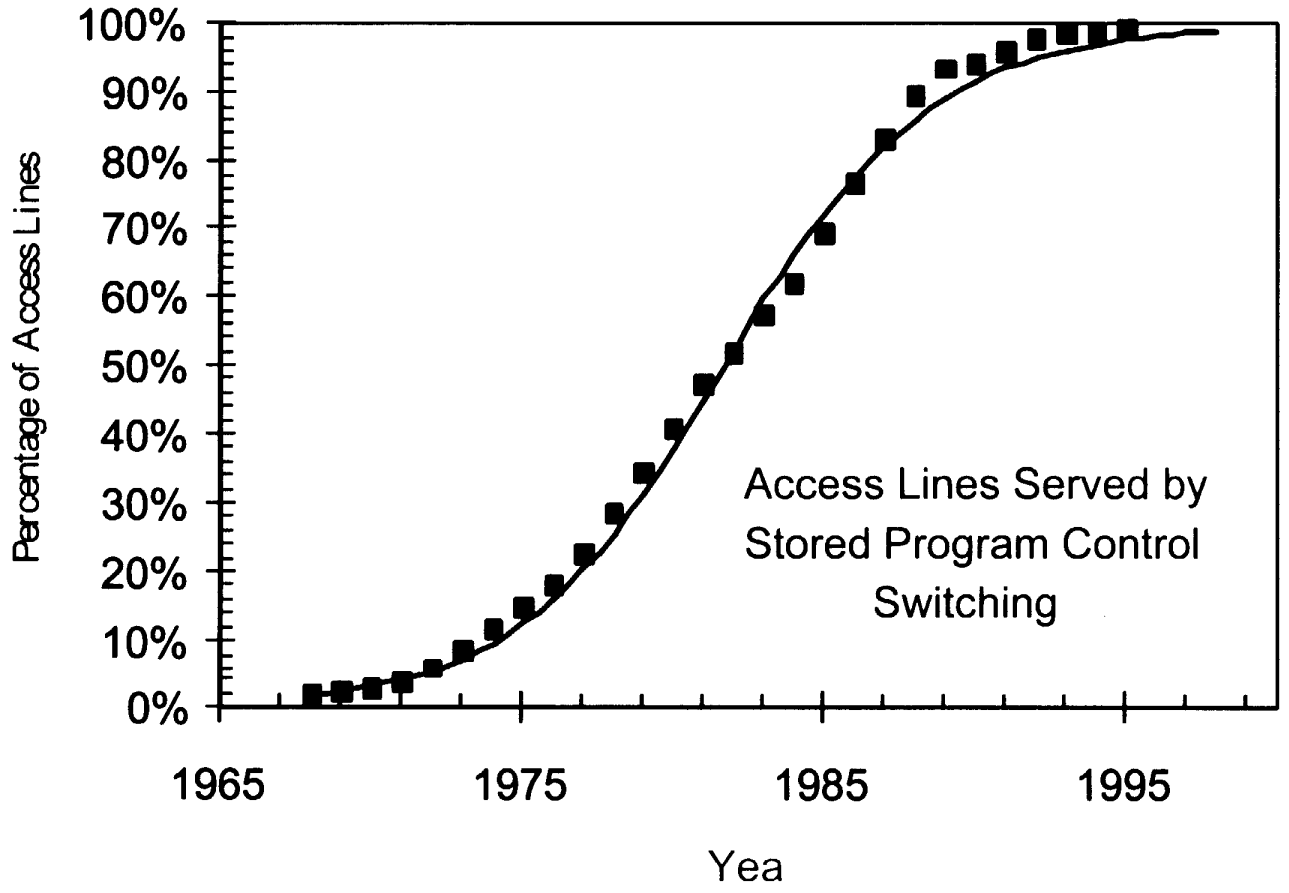
Stored Program Control Switching



Switches-spc-S

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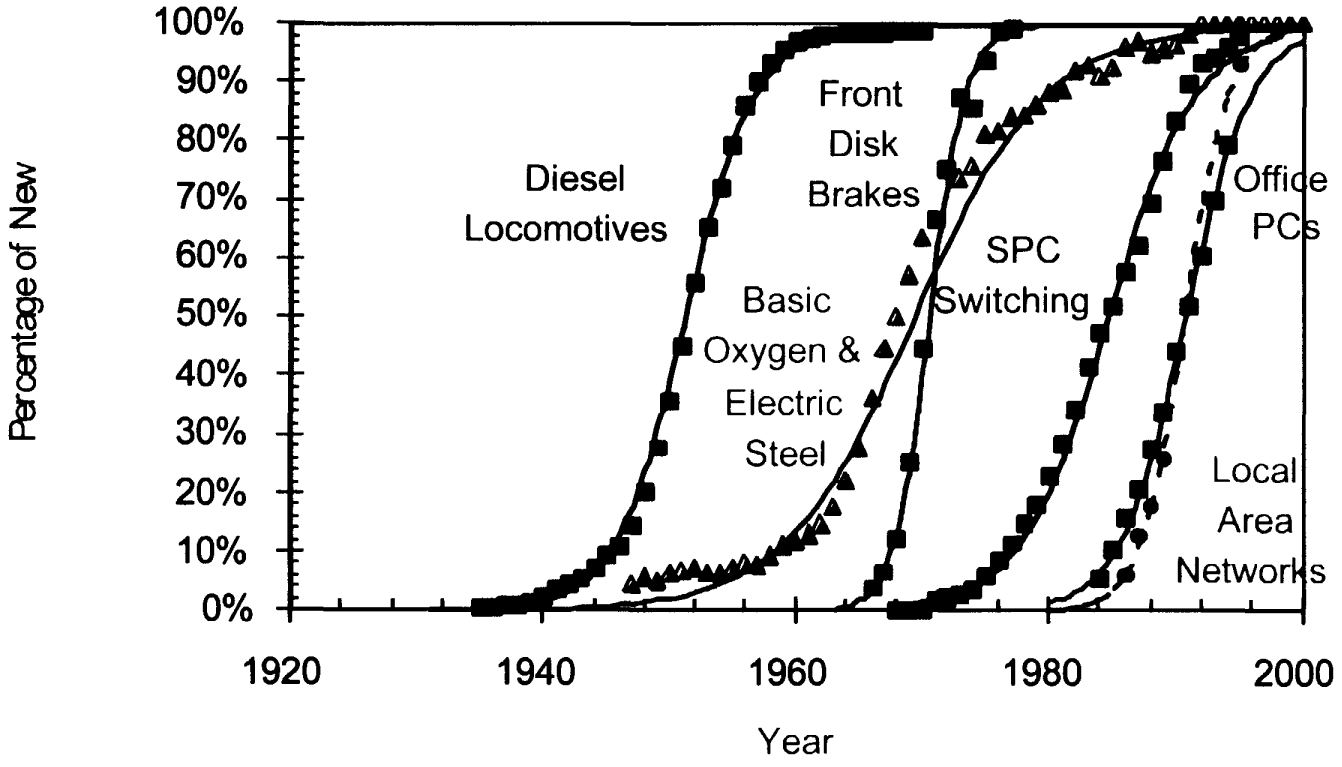
Fisher-Pry Substitution Examples



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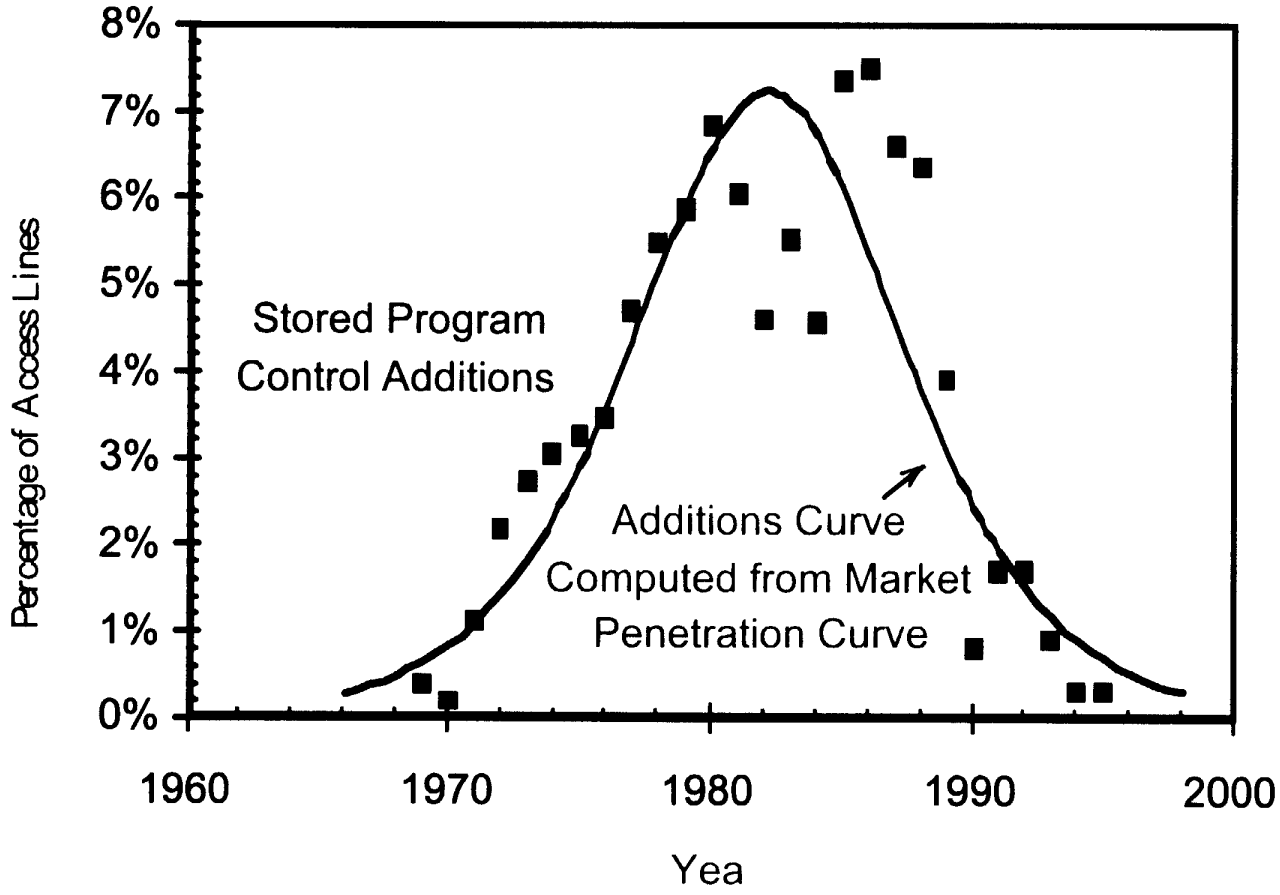
Additions of Stored Program Control Switch Access Lines (Fisher-Pry)



Switches-Adds

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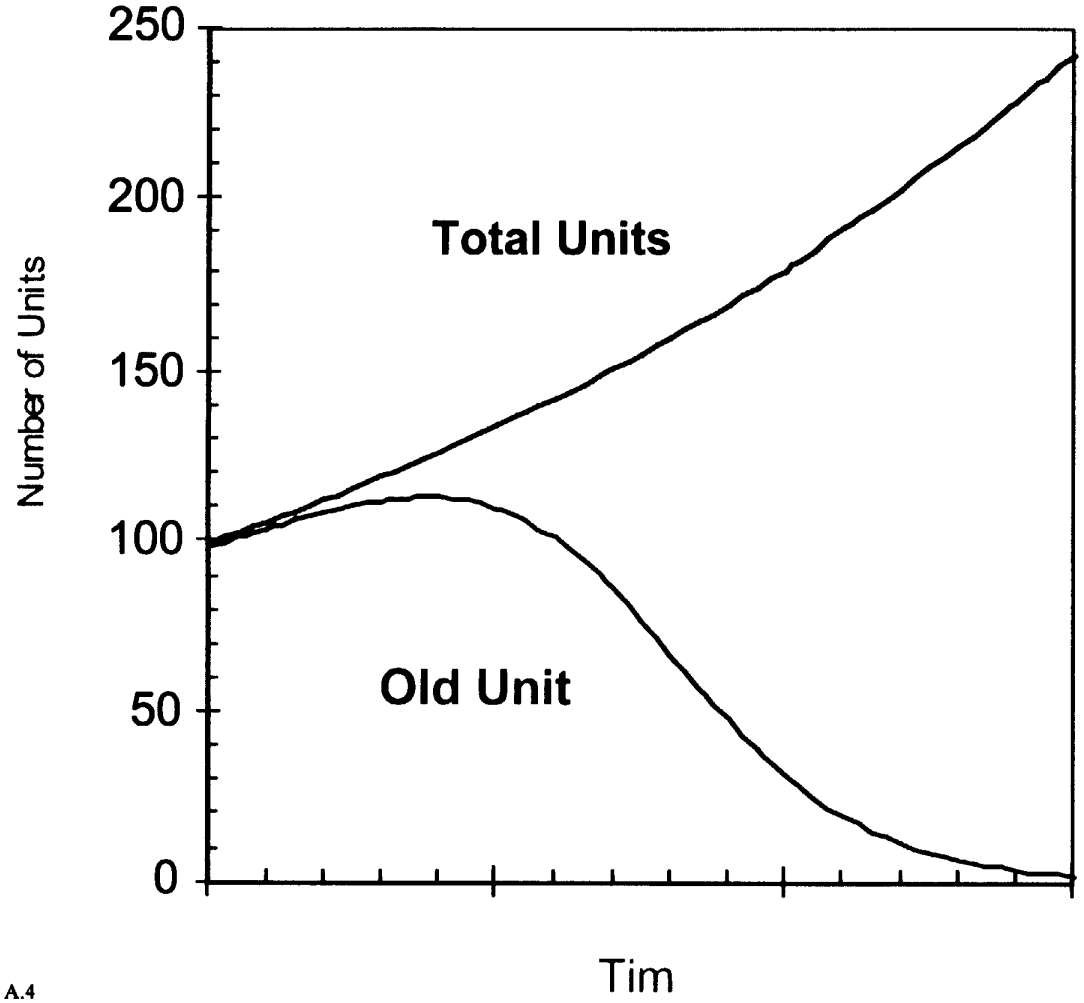
Substitution in a Growing Market



TLEN2 A.4

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Substitution Special Cases

- Multiple substitution
- Capital constraints
- Market segmentation
- Linked substitutions
- Aggregation problems
- Failure to make improvements
- Last gasp advances in old technology

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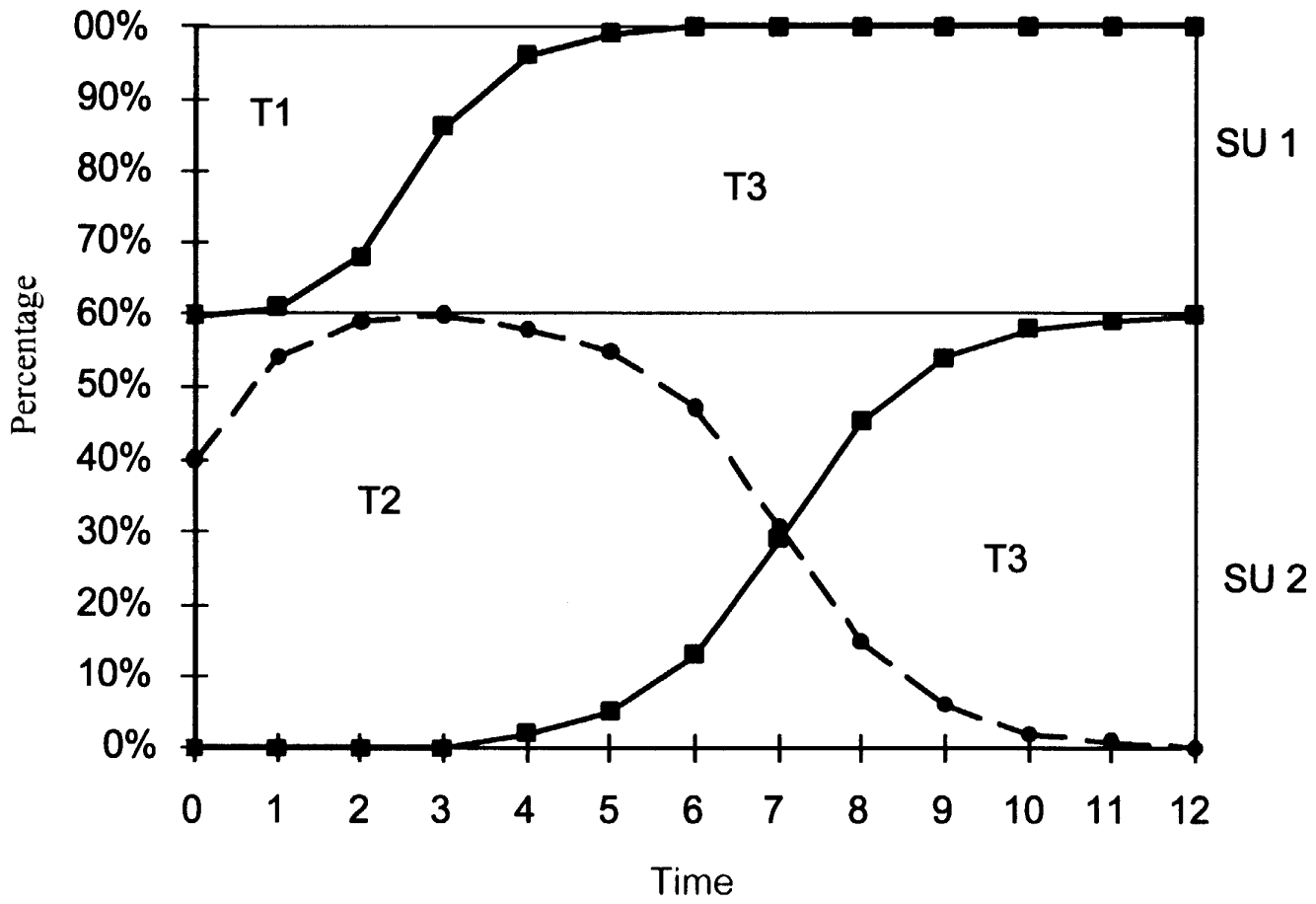
Non-Homogeneous Multiple Substitutions



Mult Sub2-sh3

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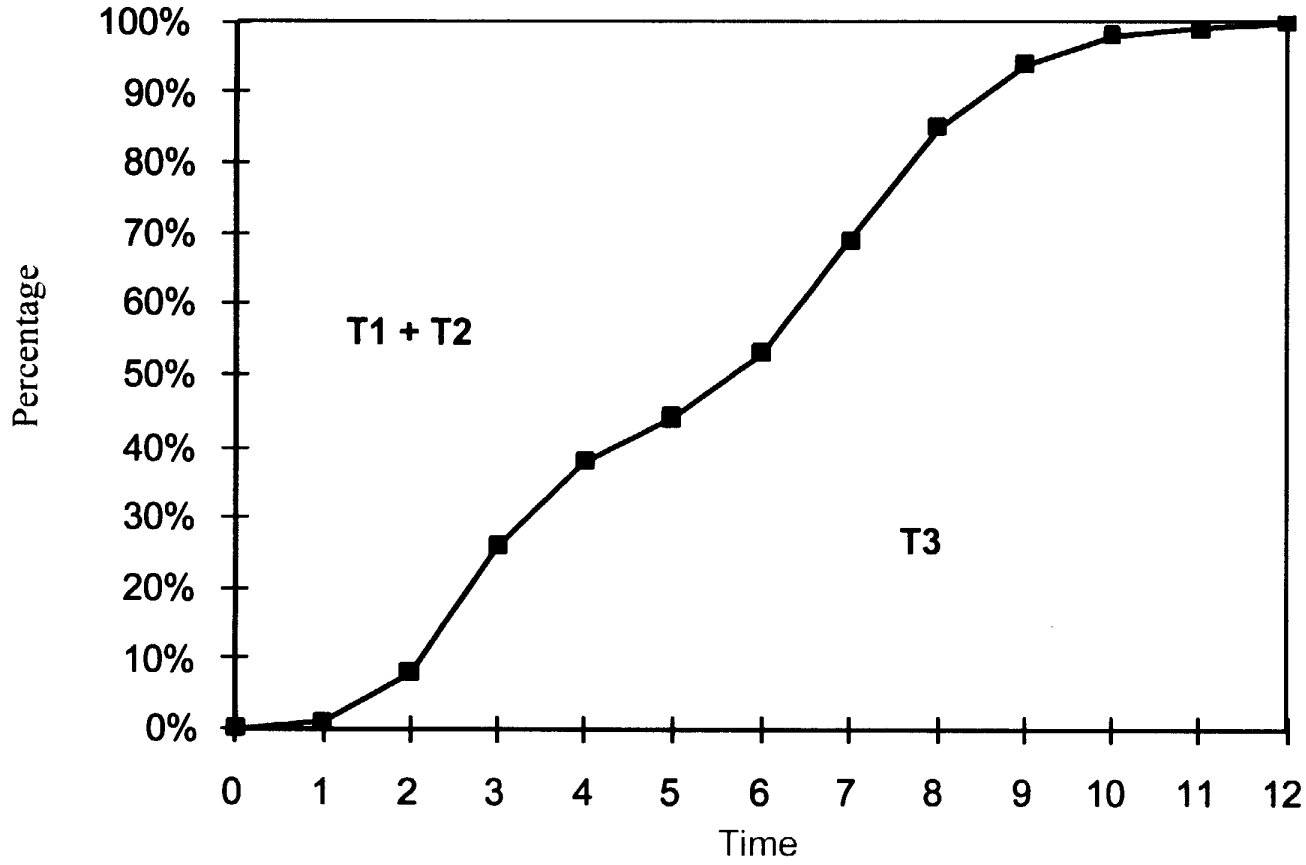
Non-Homogeneous Multiple Substitutions



Mult Sub2-sh2

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Types of Depreciation Lives

- Economic—Theoretical (cash flow)
- Economic—Applied (usage-based)
- Retirement-based

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Traditional Depreciation Approach

- Life indicators (past experience)
- Life estimation (other factors)
- Projection life & survivor curve (new equipment)
- Generation arrangement (ages of existing)
- Average remaining life (what's left)
- Depreciation rate

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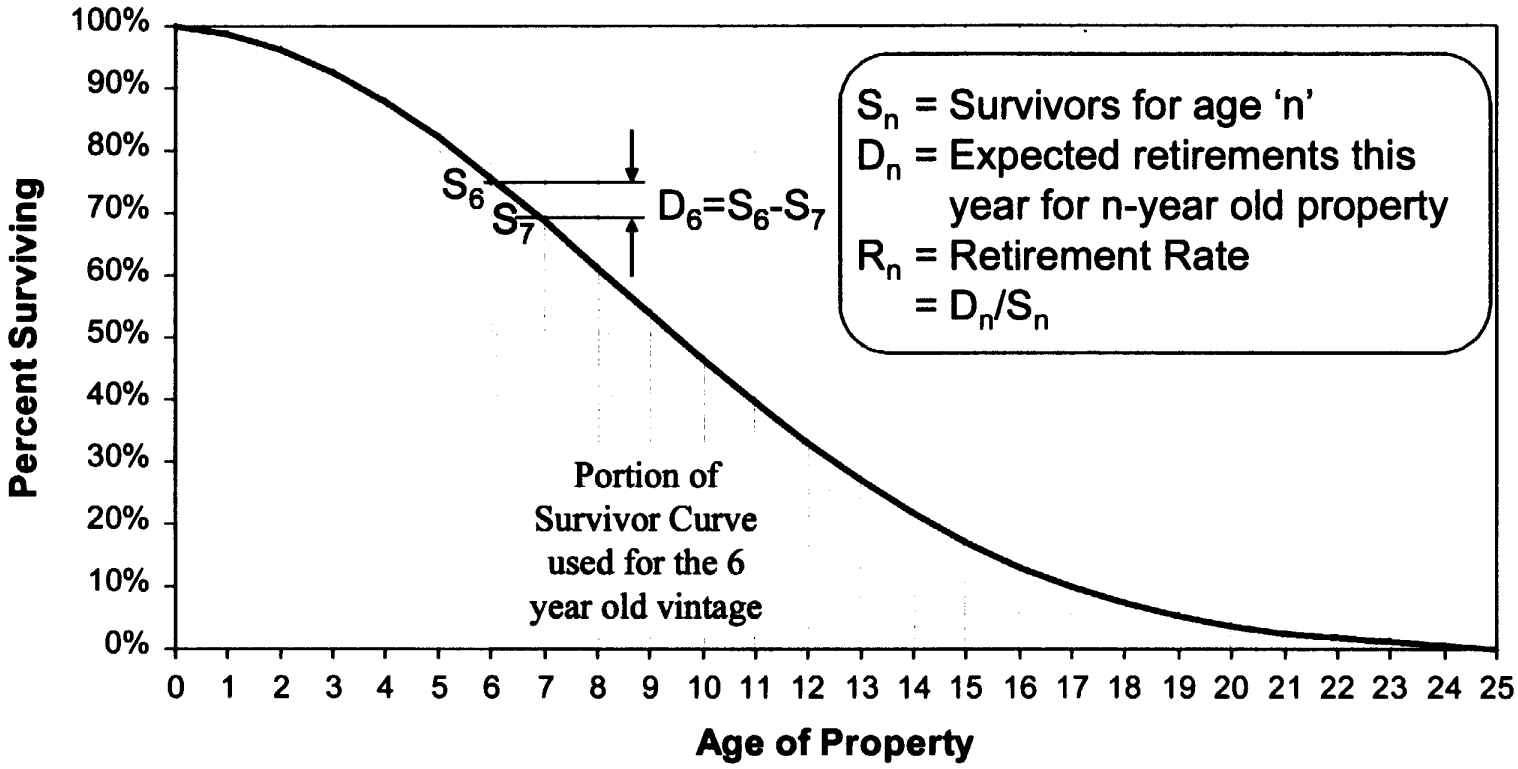
Typical Mortality Survivor Curve



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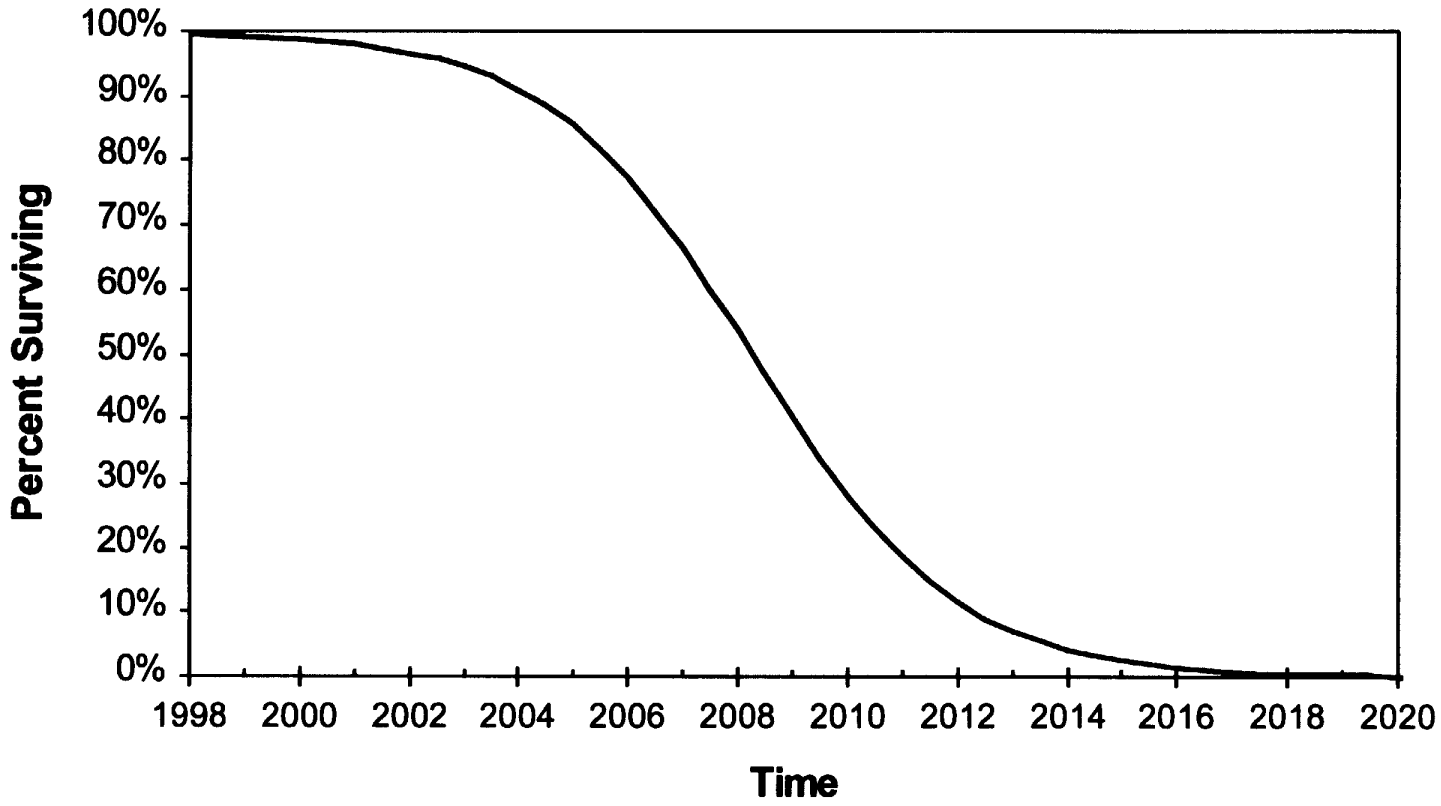
Typical Life Cycle Chart



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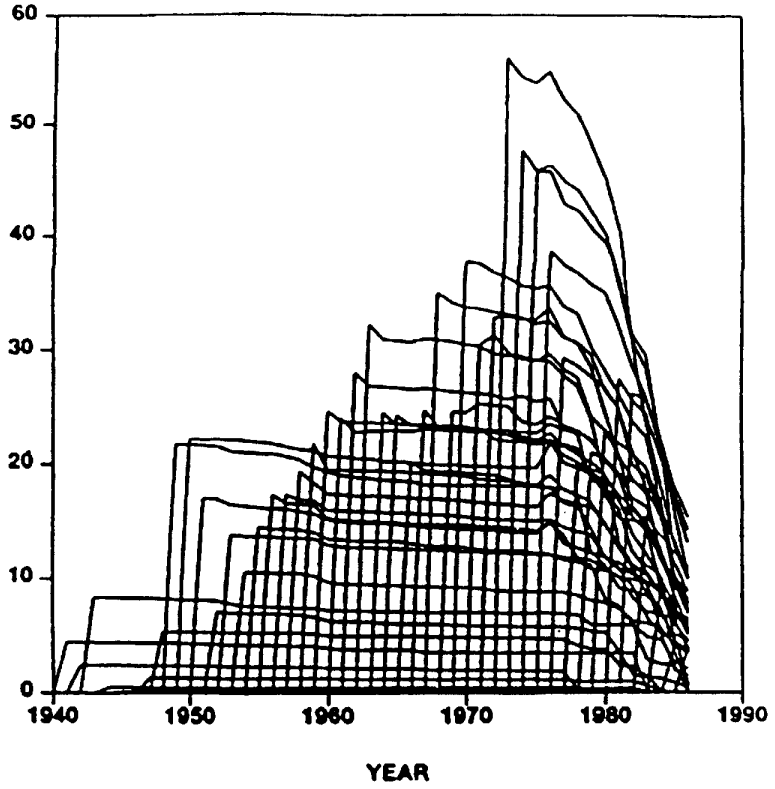
Avalanche Curves

Vintage Survivor Curves
1940-1985 Crossbar Vintages
Plant in Service (Million Dollars)



Source: Bellcore

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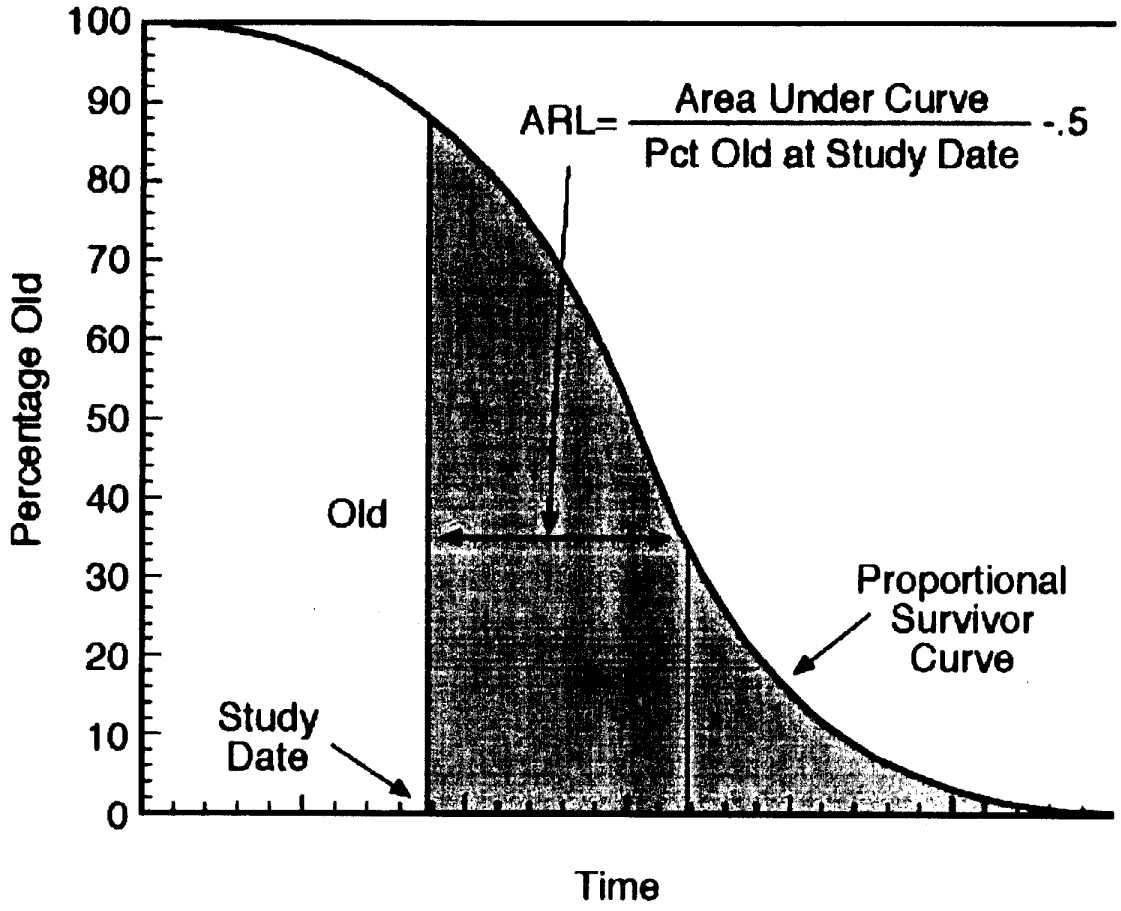
Estimating Average Remaining Life Using Substitution Analysis



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Comparison of Approaches

Traditional Mortality	Substitution Analysis
• Retirements	• Equipment Usage
• Mortality	• Obsolescence
• Historical	• Forward-looking

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Comparison of Remaining Life Results

	Electromechanical Switching	IOF Underground Metallic Cable	Analog Switching
Observed Life	**5.07**	**4.23**	**4.44**
Traditional Mortality	15.67	23.58	10.14
Substitution	**5.44**	3.45	3.32
Combined Obsolescence	5.60	**4.22**	**3.92**

The Observed Lives shown here are usage-based lives.

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Summary of TFI Industry Life Recommendations

Technology	Average Remaining Life (1/1/97)	Projection Life__New Investment	Projection Life__Existing Investment
Outside Plant			
Copper Cable			
Interoffice	2.8	3	8-10
Feeder	7.2	7	15-17
Distribution			
Early Scenario	8.1	10	14-18
Middle Scenario	9.8	12	15-20
Late Scenario	11.5	14	17-23
TFI Recommended	**8-10**	**10-12**	**14-20**
Fiber Cable			
All Categories	12-16	20	20
Circuit Equipment			
Analog	2.1	---	---
Non-SONET (Digital)	3.6	4	6-9
SONET	5-8	8	8
Switching			
Analog	2.1	---	---
Digital	6.3	8	9-12

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Outside Plant Basic Forecasts

1. Interoffice
2. Feeder
3. Distribution

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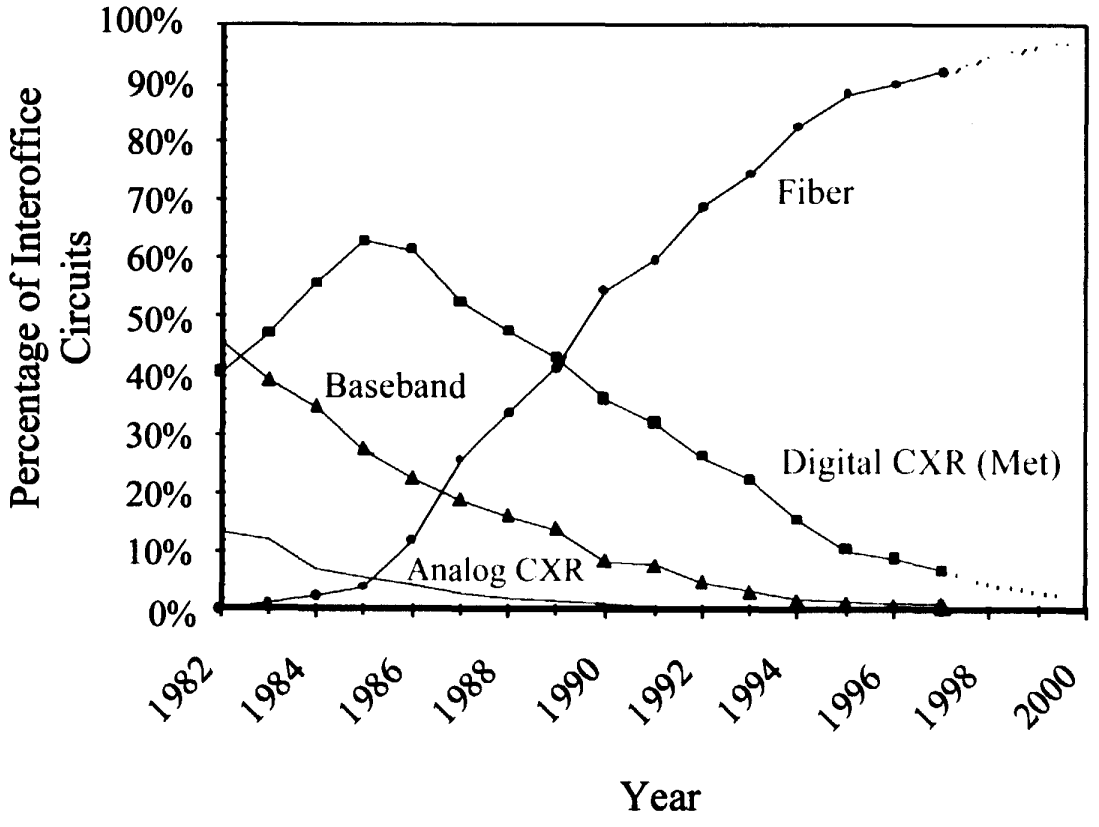
Interoffice Technology Shares



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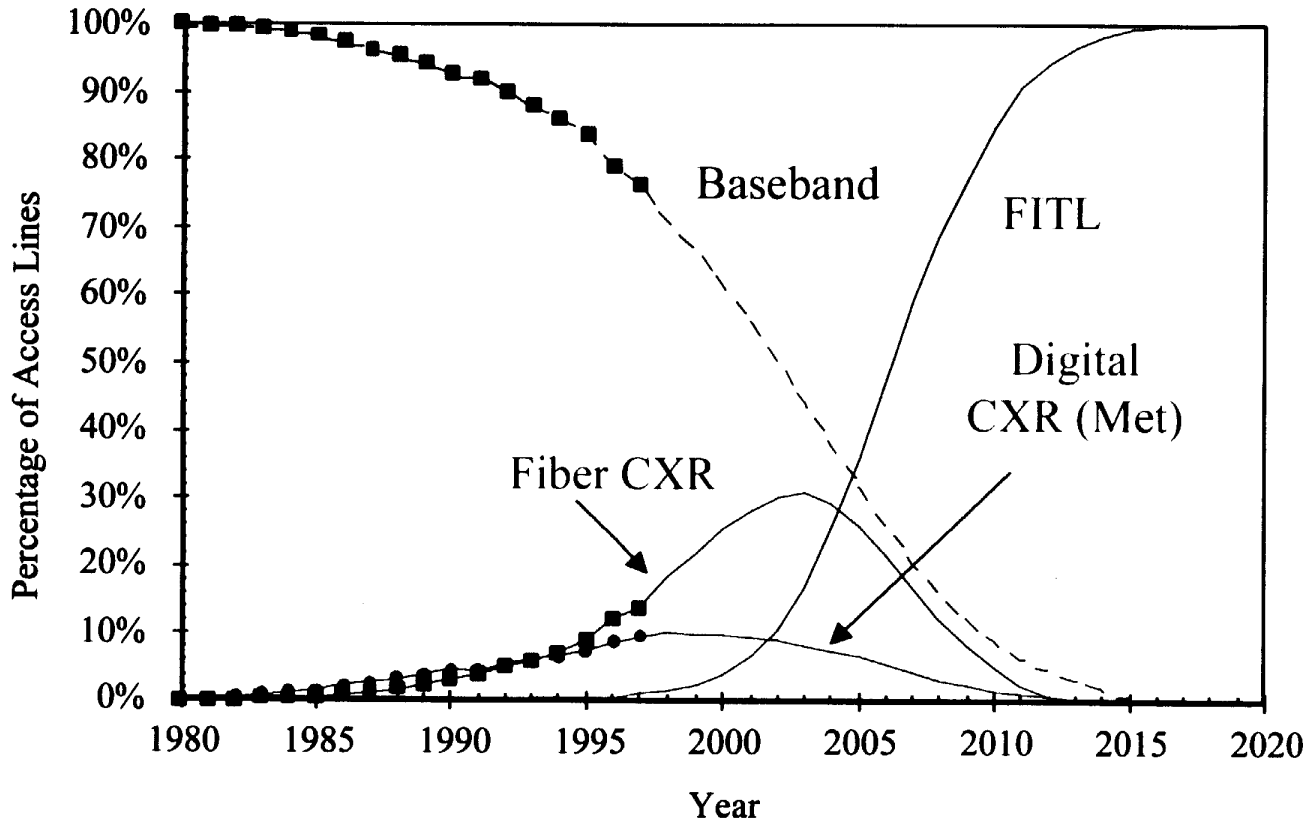
Feeder Technologies— Percentage of Access Lines



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